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| 10/695,010 | 10/28/2003 | David William Abraham | YOR920030018US1 | 4252 |
| 34663 | 7590 | 09/05/2006 | EXAMINER | |
| MICHAEL J. BUCHENHORNER 8540 S.W. 83 STREET MIAMI, FL 33143 | | | WEINBERG, MICHAEL J | |
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| | | | 2827 | |

DATE MAILED: 09/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/695,010

Applicant(s)

ABRAHAM ET AL.

Examiner

Michael J. Weinberg

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,8-12,15 and 16 is/are rejected.
- 7) ☒ Claim(s) 1-14 and 16-20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/28/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

The sentence beginning in page 2, line 11 needs to be corrected so that "memory cells" agrees with the rest of the sentence. There is also an extra comma before "stimuli".

Appropriate correction is required.

Claim Objections

2. Claims 1-14 and 16- 20 are objected to because of the following informalities:

In claims 1-7, all instances of "the reference cell" should be "the at least one reference cell" as in the preamble.

In claim 1, "magnetic memory cell array" should most likely be "memory cells in a magnetic memory cell array" in order to fit with claim 5.

In claim 1, lines 7-8, "the magnetic memory cell" should most like be "the at least one reference cell".

In claims 2 and 9, "orientation" should be "orientations" and "magnetization" should be "magnetizations".

In claim 4, line 4, "currents" should be "current".

In claim 4, line 6, "altered" should most likely be in the present tense "alter".

In claim 7, there should be a comma after "cell".

In claim 8, line 7, "a" should be deleted".

In claim 10, "which reference cells has the orientation of their magnetization altered" should most likely be "which reference cells ~~[[has]]~~ have the orientations of their magnetizations altered".

Further in claim 10, "is modified" should be "are modified".

Further in claim 10, there should be a comma before "and" in line 4.

In claim 11, "an" should be changed to "a".

In claim 12, "has" should be changed to "have".

In claim 16, 17, and 20, "a reference magnetic memory cell" should be changed to "the reference magnetic memory cell" as there is already antecedent basis for the memory cell.

In claim 16, it is unclear if "a series of magnetic memory cells" is the same as "an array of magnetic memory cells" in claim 15. The magnetic memory cells could be changed to "reference magnetic memory cells".

In claim 17, line 2, "a test signals" should just be "test signals".

In claims 4 and 17, it is unclear what "similar" means. The word is indefinite.

In claim 17, it is unclear if the array is the same as the array in claim 15.

In claim 19, there is no antecedent basis for "the reference magnetic memory cells".

In claim 20, there is no antecedent basis for "the test signals."

Other claims are objected to as being dependent of objected claims. Appropriate correction or explanation is required. In light of the extensive number of minor errors

present in the claims, Applicant's cooperation is requested in correcting any further errors of which Applicant may become aware.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 8-10, 12, 15, and 16 rejected under 35 U.S.C. 102(e) as being anticipated by Perner (US Patent 6,791,873).

With regard to **claim 1**, Perner discloses a method for minimizing errors (half-select errors- col. 4, line 56) when writing information to a magnetic memory cell array with operating write currents, wherein the magnetic memory cell array comprises at least one reference cell (test magnetic memory cells 530, as shown in the abstract) having known operating characteristics and a magnetization with an alterable orientation (see abstract or background of the invention, for example), the method comprising:

applying test write currents having pre-selected attributes for altering orientation of the magnetization of the reference cell (see figure 8, step 810);

determining whether or not the orientation of the magnetization in the magnetic memory cell was altered (figure 8, step 820); and

modifying the operating write currents based upon whether or not the orientation of the magnetization in the reference cell was altered (figure 8, step 830).

(Please note that the grounds for rejection above are based on one embodiment of the method of Perner, but rejections are also possible using other disclosed embodiment.)

With regard to **claims 2 and 9**, , Perner further discloses the method of claim 1 and the circuit of claim 8, respectively, wherein the at last one reference cell further comprises an array of references having different attributes (col 9, lines 16-20- "two test magnetic memory cells being oriented in opposite directions") and

wherein the operating write currents are modified based upon which reference cells in the array of reference cells have the orientations of their magnetizations altered by the test write circuit. (Col. 6, lines 1-5- "The controller senses that a [ie a particular] test magnetic memory cell has changed its state to the alternating pulsed magnetic field created..." Soon the write currents are modified based on this particular memory cell.)

With regard to **claim 8**, Perner discloses a compensation circuit for determining appropriate write signals to use during a write operation to an array of magnetic memory cells wherein each magnetic memory cell in the array has a magnetization with an orientation that is alterable between at least two states (see abstract and background), said compensation circuit comprising:

a write signal generator 510 for generating write signals (in step 810 of figure 8) that are used to selectively alter the orientation of magnetization in the magnetic memory cells in the array of magnetic memory cells and test write signals;

a reference cell (test cells) 530 having a magnetization with an orientation that is alterable between at least two states for receiving the test write signals from the write signal generator 510; and

a reference cell reader 690 (sense amp connected to the test cells) for determining the orientation of the magnetization (in step 820 of figure 8) in the reference cell 530 after the reference cell has received the test write signals;

wherein the write signal generator 510 selectively modifies the write signals (in step 830 of figure 8) based upon the orientation of the reference cell after the reference cell has received the test write signals.

With regard to **claim 10**, Perner further discloses a circuit of claim 8 wherein the at least one reference cell 530 further comprises an array of reference cells 530 having similar attributes (They appear to be the same.), the test write signals received by each reference cell are modified by a signal modification circuit (comprising at least current generator 510) associated with each reference cell and the write signals are modified based upon which reference cells have the orientation of their magnetization altered in response to being sent the test write signals. (see figures 7, 10b, and 11b where the write currents are modified. Perner teaches various embodiments that modify write signals based upon one of the at least one test cells 350 switches or not. For example, see column 8's description of figure 11, especially step 1130.)

With regard to **claim 12**, Perner further discloses the circuit of claim 10 wherein each signal modification circuit comprises wires (as shown in figures 5/6) for carrying the test write signals to an associated reference cell wherein the wires for each signal

modification circuit have different attributes (One attribute can be length, and thus resistance, of the wires. Clearly the wire to a closer cell is different than one to a cell that is further away.)

With regard to **claim 15**, Perner discloses a method for compensating for changes in an optimum operating point for write signals used to alter an orientation of a magnetization in a magnetic memory cell in an array of magnetic memory cells, said method comprising (among other relevant parts, see abstract):

measuring changes in switching characteristics of a reference magnetic memory cell 530 (figure 8, 820); and

modifying attributes of the write signals used to alter the orientation of the magnetization in the magnetic memory cells based upon the measured changes in the switching characteristics of the reference magnetic memory cell (figure 8, 830).

With regard to **claim 16**, (as far as understood) Perner discloses a method of claim 15 wherein the step of measuring changes in switching characteristics of a reference magnetic memory cell further comprises sending test signals to a series of magnetic memory cells having predetermined attributes (inherent) and determining which reference magnetic memory cells have the orientations of their magnetizations altered by the test signals. (see figures 7, 10b, and 11b where the test signals are shown. Perner teaches various embodiments that have test signals based upon one of the at least one test cells 350 switches or not. For example, see column 8's description of figure 11, especially step 1130.)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perner (as shown above) in view of Savtchenko et al (US Patent 6,545,906).

With regard to **claims 5 and 11**, Perner teaches the method of claim 1 and circuit of claim 8, respectively, but does not teach that his MRAM cells are rotational magnetic memory cells.

However, as the rotational memory cells of Savtchenko were well-known at the time of the invention, it is considered obvious to one of ordinary skill in the art to use the method of Perner with the device of Savtchenko.

Motivations to use a rotational magnetic memory cell include “an improved error rate” and “a switching field that is less dependant on shape” as taught in col. 2, lines 1-16 of Savtchenko.

Allowable Subject Matter

7. Claims 3, 4, 6, 7, 13, 14, and 17-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten to traverse the above rejections and in independent form including all of the limitations of the base claim and any intervening claims.

With regard to **claim 3**, the prior art does not teach or suggest the method of claim 2 wherein each reference cell in the array of reference cells has a different junction size, *in combination with the other limitations of the claim*.

With regard to **claims 4 and 6**, the prior art does not teach or suggest the method of claim 1 wherein the at least one reference cell further comprises an array of reference cells having similar attributes and wherein the step of applying test write currents to alter orientations of the magnetizations of the reference cells further comprises *providing each reference cell with a different test write current having pre-selected attributes* and the operating write currents are modified based upon which test currents alter the orientation of the magnetization of the reference cells, in combination with the other limitations of the claim.

With regard to **claims 7, 13, 14, and 20**, the prior art does not teach or suggest measuring a phase difference between test signals and changes in the orientation of the magnetization of the reference magnetic memory cell, *in combination with the other limitations of the claim*.

With regard to **claims 17-19**, the prior art does not teach or suggest sending test signals to an array of similar magnetic memory cells such that each magnetic memory cell is driven by a different magnetic field, *in combination with the other limitations of the claims*.

Conclusion


8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Weinberg whose telephone number is 571-272-6424. The examiner can normally be reached on M-F 9:00 am-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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